# SPECIFICATION

Docket No. **0417MH-26063**

## TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that I, **JAN SCOTT ZWOLINSKI**, a citizen of the United States of America, residing in the City of Graford, Texas, have invented new and useful improvements in a

### METHOD AND APPARATUS FOR PROVIDING A HANDHELD
### SCANNER-DICTIONARY APPARATUS

of which the following is a specification:

# BACKGROUND OF THE INVENTION

1.  **1.  Cross-Reference to Related Application:**

2.  This application claims the benefit of U.S. Provisional Patent Application

3.  Serial No. **60/041,534**; filed **25 March 1997**, entitled *Method and Apparatus for*

4.  *Providing a Handheld Scanner-Dictionary Apparatus*.

5.  **2. Field of the Invention:**

6.  The present invention relates in general to portable electronic devices,

7.  and particularly to portable electronic devices which are useful for providing

8.  dictionary and/or translation functions for a reader.

9.  **3.  Description of the Prior Art:**

10.  Readers frequently incur words in reading material which they do

11.  not fully understand.  Their options are to utilize a conventional dictionary to

12.  look up the words, or a handheld keypad-type dictionary device in order to look

13.  up the words electronically.  Both have their disadvantages.  The conventional

14.  dictionary requires a reader to manipulate a relatively cumbersome device and

15.  locate the entry by turning pages.  The electronic device requires the reader to

16.  directly key in the word for which he/she seeks a definition.

# SUMMARY OF THE INVENTION

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2       It is one objective of the present invention to provide a portable handheld
3 device which combines the functions of a scanner with a portable electronic dictionary
4 device with an LCD or other display for displaying the definition of the word that has been
5 scanned in with the device.

6       It is another objective of the present invention to provide the handheld
7 scanner dictionary with an optional keypad operation which allows the user to physically
8 manipulate a keypad or to utilize a stylus and a graphical user interface keypad in order
9 to key in the word for which a definition is sought.

10       It is another objective of the present invention to provide a handheld
11 scanner-dictionary which includes an alternative voice operation which utilizes a micro-
12 phone and a speech-to-text module to receive a word as an input. The handheld scanner-
13 dictionary will then retrieve the definition and either voice-announce the definition or
14 display the definition in an LCD display, or a combination of voice-announce and display.

15       It is another objective of the present invention to combine the above-
16 identified features of the handheld scanner-dictionary with a conventional pager.

17       It is another objective of the present invention to provide the above-identified
18 handheld scanner-dictionary with a translation function which fetches a foreign language
19 definition of a particular word that is input into the device.

20       It is yet another objective of the present invention to provide the above-
21 identified handheld scanner-dictionary with conventional clock and alarm functions.

# BRIEF DESCRIPTION OF THE DRAWING

**Figure 1A** is a pictorial representation of one particular embodiment of the handheld scanner-dictionary of the present invention with a detachable keyboard.

**Figure 1B** is a pictorial representation of a book.

**Figure 1C** is a pictorial representation of an alternative embodiment of the handheld scanner-dictionary with an enlarged display area which allows the utilization of a graphical user interface touch screen keyboard input device.

**Figure 2** is a block diagram representation of the preferred handheld scanner-dictionary of the present invention.

**Figures 3A** and **3B** are flowchart representations of scanning operations utilizing the handheld scanner-dictionary of the present invention.

**Figures 4A** and **4B** are flowchart representations of keypad input operations utilizing the improved handheld scanner-dictionary of the present invention.

**Figures 5A** and **5B** are flowchart representations of voice input operations utilizing the handheld scanner-dictionary of the present invention.

**Figure 6** is a flowchart representation of pager operations utilizing the handheld scanner-dictionary of the present invention.

**Figure 7** is a flowchart representation of translation function operations utilizing the scanner-dictionary of the present invention.

1        **Figure 8** is a flowchart representation of the clock and alarm functions

2    utilizing the handheld scanner-dictionary of the present invention.

# DETAILED DESCRIPTION OF THE INVENTION

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2    The handheld scanner-dictionary of the present invention is a device which

3    makes it easy for a reader to "look up" a word encountered during reading with which the

4    reader is unfamiliar or for which the reader desires a precise definition.  The handheld

5    scanner-dictionary of the present invention is greatly advantageous over the prior art in

6    that it is easy to use and thus encourages and enhances the reader's quest for an

7    increased or enhanced vocabulary.

8    The handheld scanner-dictionary of the present invention includes several

9    modes of operation.  In a scanning input mode of operation, a scanning device is utilized

10   to scan text into the handheld scanner-dictionary, much in the way that a handheld bar

11   code reader is used to "wand" product information into a cash register.  The handheld

12   scanner-dictionary will fetch from memory a dictionary definition corresponding to the

13   scanned word.  The dictionary definition is provided to the reader through either an LCD

14   display and/or an audio output device, such as a speaker.  This way, the reader may

15   either read the definition or hear the definition, whichever is more convenient.

16   Another mode of operation is a keypad input mode of operation in which a

17   keypad is utilized to input the word for which a definition is sought.  A detachable

18   keyboard may be utilized to physically input the characters of the word for which a defini-

19   tion is sought.  Alternatively, a graphical user interface may be provided in the LCD

20   display, which operates as a touch screen.  A graphical display of a keyboard may be

21   displayed in the LCD device, and the operator may utilize a stylus to sequentially enter

22   the letters which make up the word for which a definition is sought.

23   In yet another alternative mode of operation, the handheld scanner-dictionary

24   may be operated in a manner which allows for the voice input of the word for which a

1    definition is sought.  In this mode of operation, a microphone and speech-to-text module

2    is utilized to determine the input word for which a definition is sought.


3            Several alternative operations are also provided in the handheld scanner-

4    dictionary, such as:  a pager mode of operation, a translation mode of operation, and a

5    clock/alarm mode of operation.  These modes of operation and functions will now be

6    described with reference to the figures.


7            **Figure 1A** is a pictorial representation of one embodiment of the handheld

8    scanner-dictionary **11** of the present invention.  As is shown, the handheld scanner-

9    dictionary **11** includes a tapered end **13** which terminates at a scanner input **17**, and an

10   elongated rectangular portion **15** with user input buttons **19**, display **21**, and audio output

11   device **20**.  In the view of **Figure 1A**, display **21** is shown as displaying an input word **31**

12   and associated definition **33**.  Also, as is shown in **Figure 1A**, a detachable keyboard **23**,

13   which includes individually operable keys **25**, is electrically connected to handheld

14   scanner-dictionary **11**.  The word for which a definition is sought may be input through

15   either scanner **17** or detachable keyboard **23**.  Audio output device **20** may serve a dual

16   function:  it may serve as a microphone, and it may serve as a speaker.  When audio

17   output device **20** serves as a microphone, the handheld scanner-dictionary **11** may be

18   operated in a voice-input mode of operation wherein the user announces a word as an

19   input to the handheld scanner-dictionary, and the handheld scanner-dictionary **11** utilizes

20   speech-to-text conversion to generate the word, and then look up the definition of the

21   word and either display it or generate an audio output of the definition.


22           **Figure 1B** is a pictorial representation of book **27**.  As is shown, book **27**

23   includes textual material, including the word "port".  In accordance with the present

24   invention, the handheld scanner-dictionary **11** may be utilized to scan in the word "port"

1    29 and generate a definition either in display **21** or as an output from audio output device

2    **20.**

3              **Figure 1C** depicts an alternative embodiment of the handheld scanner-

4    dictionary **41**, wherein tapered end **43** terminates at scanning input **47** and body section

5    **45** is larger than in the previous embodiment in order to accommodate a larger display **49**

6    which may be utilized to present a graphical user interface, touch screen display of a

7    keypad.  Graphical user interface display **51** displays the characters which may be

8    selected through utilization of stylus **53** in a conventional manner.

9              **Figure 2** is a block diagram representation of the components which make

10   up handheld scanner-dictionary **11**, **41** of **Figures 1A** and **1C**.  The handheld scanner-

11   dictionary includes a central processing unit **101** and associated power circuit **119**, clock

12   circuit **121**, ROM **103**, and RAM **105**, as is conventional.  CPU **101** is also communica-

13   tively coupled to infrared receiver/transmitter **117** which may be utilized in a conventional

14   manner to communicate through an infrared link to a desktop or laptop computer in order

15   to exchange data.  Optical reader circuit **107** is provided, which provides its output to

16   signal processing circuit **109**.  Characters may be scanned utilizing the optical reader

17   circuit **107**.  The signal is processed at signal processing circuit **109** and provided to

18   central processing unit **101**.  CPU **101** is also connected to microphone **113** through

19   signal processing circuit **115**.  In the voice-input mode of operation, microphone **113** is

20   utilized to detect voice-enunciated words.  Signal processing circuit **115** utilizes a con-

21   ventional speech-to-text system to generate a textual word from the detected voice input,

22   and provide that textual word to CPU **101**.  CPU **101** is also connected to operator input

23   **123** which includes a number of dedicated buttons for commanding and controlling the

24   handheld scanner-dictionary.  Such buttons include "On" button **125**, "Off" button **127**,

25   "Scroll Up" button **129**, "Scroll Down" button **131**, "Audio On" button **133**, and any

26   other conventional or novel command buttons that are desired.  CPU **101** is also con-

1 nected to audio driver **135** which drives audio output device **137**. When the operator

2 selects the "Audio On" button, CPU **101** will generate signals which actuate audio driver

3 **135** to energize audio output device **137** to provide a voice definition for the particular

4 word selected. CPU **101** is also connected to LCD display **139** which provides a display

5 of the definition of the word received as an input at the handheld scanner-dictionary

6 device. A touch screen function **141** is provided in order to allow a stylus to be utilized

7 to interact with a graphical user interface in order to key in the characters which make

8 up an input word. Alternatively, CPU **101** is connected to detachable keypad **111** which

9 may be utilized for typing in the input word. As is discussed above, the handheld

10 scanner-dictionary of the present invention may be utilized in combination with a pager.

11 In this particular function, an RF receiver **143** is provided which communicates with

12 paging circuit **145** which is communicatively coupled to CPU **101**. The pager operates

13 in a conventional manner.

14 Figures **3A** and **3B** are flowchart representations of the scanning input mode

15 of operation of the handheld scanner-dictionary of the present invention. The process

16 begins at software block **201** and continues at software block **203**, wherein operator

17 input is monitored. In accordance with software blocks **205** and **209**, the handheld

18 scanner-dictionary monitors to determine whether the operator has turned the device on,

19 and whether the operator has selected the audio output mode of operation. If the device

20 is turned on, the power-up device software module **207** is activated. If the audio output

21 is selected, the software module of activate audio **211** is activated. In accordance with

22 software block **213**, the handheld scanner-dictionary monitors operator input to determine

23 whether a wand operation has commenced. In other words, the handheld scanner-

24 dictionary determines whether a scanning operation has commenced. Once the scanning

25 operation has been detected, the optical reader is activated in accordance with software

26 block **215**, the text is processed in accordance with software block **217**, the text is

27 passed to the CPU **101** in accordance with software block **219**, and CPU **101** fetches the

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1 definition from ROM in accordance with software block **221**. Next, in accordance with

2 software block **223**, the handheld scanner-dictionary generates an audio driver signal and

3 an LCD display signal. In accordance with software block **225**, these signals are pushed

4 to the audio output device and to the LCD display. Then, in accordance with software

5 blocks **227**, **231**, the handheld scanner-dictionary monitors operator input to determine

6 whether scrolling operations have been requested. Additionally, the handheld scanner-

7 dictionary monitors to determine whether a repeat of the definition has been requested.

8 If those functions are requested, scrolling is performed in accordance with software block

9 **229**, and repeat of the audio messages is generated in accordance with software block

10 **233**. Finally, in accordance with software block **235**, the process ends.

11 Figures **4A** and **4B** are flowchart representations of the keypad mode of

12 operation. The process begins at software block **251** and continues at software block

13 **253**, wherein the handheld scanner-dictionary monitors for operator input. In accordance

14 with software blocks **255**, **257**, **259**, and **261**, the handheld scanner-dictionary monitors

15 for operator input, for powering up the device, and for activation of the audio output

16 mode of operation. Then, in accordance with software block **263**, the handheld scanner-

17 dictionary monitors for operator selection of the keypad input. Then, in accordance with

18 software block **265**, the handheld scanner-dictionary monitors to determine whether the

19 detachable keypad is connected. If the detachable keypad is not connected, control

20 passes to software block **267**, wherein the handheld scanner-dictionary generates a

21 graphical user interface keypad and activates the touch-screen function in order to allow

22 the operator to utilize a stylus (or, alternatively, his/her finger) in order to select

23 characters as an input to the handheld scanner-dictionary. Next, in accordance with

24 software blocks **269**, **271**, and **273**, the CPU fetches the definition of the word from

25 ROM, generates an audio driver signal and an LCD display signal, and pushes these

26 signals to the audio output and to the LCD display grid. Then, in accordance with soft-

27 ware blocks **275**, **277**, **279**, and **281**, the handheld scanner-dictionary monitors for

1    operator selection of the scrolling function or repeating of the audio output of the
2    definition of the input text.  Then, the process ends at software block **283**.

3              **Figures 5A** and **5B** are flowchart representations of the voice-input mode of
4    operation.  The process begins at software block **301** and continues at software blocks
5    **303, 305, 307, 309,** and **311,** wherein the handheld scanner dictionary monitors
6    operator input and determines whether the operator has activated the handheld scanner-
7    dictionary, and selected the audio output mode of operation.  Then, in accordance with
8    software block **313,** the handheld scanner-dictionary monitors to determine whether the
9    operator has selected a voice-input mode of operation.  If so, the process continues at
10   software block **315,** wherein the handheld scanner-dictionary activates the microphone
11   function.  Next, in accordance with software block **317,** the handheld scanner-dictionary
12   processes the audio input and, in accordance with software block **319,** fetches the defin-
13   ition of the input word from ROM.  Then, in accordance with software block **321,** the
14   handheld scanner-dictionary generates an audio driver signal and an LCD display signal
15   which is pushed to the audio output and LCD display in accordance with software block
16   **323.**  Finally, in accordance with software blocks **325, 327, 329,** and **331,** the handheld
17   scanner-dictionary monitors to determine whether the operator has selected the scrolling
18   mode of operation or if the operator has requested a repeat playing of the audio output
19   of the word definition.  The process ends at software block **333.**

20             **Figure 6** is a flowchart representation of the pager operation of the handheld
21   scanner-dictionary in accordance with the present invention.  The process begins at
22   software block **351** and continues at software block **353,** wherein the handheld scanner-
23   dictionary monitors the radio frequency receiver.  In accordance with software block **355,**
24   the handheld scanner-dictionary determines whether a page has been received.  If so,
25   control passes to software block **357,** wherein the received page is compared to the
26   pager ID.  In accordance with software block **359,** the handheld scanner-dictionary

1    compares the two to determine whether a match occurs. If a match occurs, control

2    passes to software **363**, wherein the CPU is alerted to the incoming page. Then, in

3    accordance with software block **365**, the CPU generates an audio response and an LCD

4    display of the page information, as is conventional. In accordance with software block

5    **367**, the handheld scanner-dictionary announces the page utilizing the audio response and

6    LCD display, and the process ends at software block **369**.

7    **Figure 7** is a flowchart representation of the translation function of the

8    handheld scanner-dictionary of the present invention. The process commences at

9    software block **401** and continues at software block **403**, wherein the handheld scanner-

10   dictionary is provided with a search word. This search word may be received via the

11   scanning input, the keyboard input, or the audio input, as discussed above. In

12   accordance with software block **405**, the handheld scanner dictionary determines whether

13   the translation function has been requested. If so, control passes to software block **407**,

14   wherein the language options are announced or displayed. Then, in accordance with soft-

15   ware block **409**, the handheld scanner-dictionary monitors for the language selection. In

16   this manner, a handheld scanner-dictionary may be programmed to provide translations

17   into several different languages. In accordance with software block **411**, an audio

18   response and display is generated which provides the foreign language translation in both

19   human-perceptible text in the display and human-perceptible audio output from the audio

20   output device. The process ends at software block **413**.

21   **Figure 8** is a flowchart representation of the clock/alarm function of the

22   handheld scanner-dictionary of the present invention. The process begins at software

23   block **415**, commences at software block **417** wherein the handheld scanner-dictionary

24   determines the clock/alarm has been selected. As is conventional with clock/alarm

25   devices, user is presented with a variety of options, including setting the clock in

26   accordance with software blocks **419**, **421**, setting the alarm in accordance with

1    software blocks **423, 425,** and displaying the clock according to software blocks **427,**

2    **429.** The process ends at software block **431**.